

Notice of Allowability

Application No.

10/726,670

Applicant(s)

CHOU ET AL.

Examiner

Art Unit

Juanita D. Stephens

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Election filed 4/20/2006.
2. ☒ The allowed claim(s) is/are 1-12.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In claim 1, line 3 replaced "the tank" with --a tank--.

In claim 4, line 3 replace "the antinode" with --an antinode--.

2. The following is an examiner's statement of reasons for allowance:

The prior art does not disclose, suggest, or render obvious the combination of a fluid storing tank at least one microchannel arranged at the tank body of the fluid storing tank for communicating the fluid storing tank with outside world, a thermoacoustic device further comprising a resonant tube, within which stores a working gas and forming a resonant acoustic wave, at least one stack, arranged in the resonant tube, a heater, fixed in the resonant tube and located at one side of the stack, at least a heat exchanger, arranged at a side of the stack in the resonant tube opposite to the heater and wherein a working microfluid is stored in the fluid storing tank and the heater located at the side of the stack heats the working gas such that a temperature greater than a critical temperature gradient between the two sides of the stack is formed, and consequently, the acoustic wave is generated. This invention solves the problem of driving the working fluid indirectly, which can be applied to non-conductive fluids, thus

greatly increasing the fields and kinds of applicable fluid that can be used and may effectively lower cost.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The prior art of Jeng et al. (US 7,062,921 B2) discloses a thermoacoustic device (Fig. 7), but does not disclose the combination of a fluid storing tank at least one microchannel arranged at the tank body of the fluid storing tank for communicating the fluid storing tank with outside world, a thermoacoustic device further comprising a resonant tube, within which stores a working gas and forming a resonant acoustic wave, at least one stack, arranged in the resonant tube, a heater, fixed in the resonant tube and located at one side of the stack, at least a heat exchanger, arranged at a side of the stack in the resonant tube opposite to the heater and wherein a working microfluid is stored in the fluid storing tank and the heater located at the side of the stack heats the working gas such that a temperature gradient greater than a critical temperature gradient between the two sides of the stack is formed, and consequently, the acoustic wave is generated.

The prior art of Gabrielson (US 5,369,625) discloses a thermoacoustic sound generator (Fig. 1), but does not disclose the combination of a fluid storing tank at least one microchannel arranged at the tank body of the fluid storing tank for communicating the fluid storing tank with outside world, a thermoacoustic device further comprising a resonant tube, within which stores a working gas and forming a resonant acoustic wave, at least one stack, arranged in the resonant tube, a heater, fixed in the resonant tube and located at one side of the stack, at least a heat exchanger, arranged at a side of the stack in the resonant tube opposite to the heater and wherein a working microfluid is stored in the fluid storing tank and the heater located at the side of the stack heats the working gas such that a temperature greater than a critical temperature gradient between the two sides of the stack is formed, and consequently, the acoustic wave is generated.

The prior art of Reinke (US 5,339,640) discloses a heat exchanger for a thermoacoustic heat pump, but not disclose the combination of a fluid storing tank at least one microchannel arranged at the tank body of the fluid storing tank for communicating the fluid storing tank with outside world, a thermoacoustic device further comprising a resonant tube, within which stores a working gas and forming a resonant acoustic wave, at least one stack, arranged in the resonant tube, a heater, fixed in the resonant tube and located at one side of the stack, at least a heat exchanger, arranged at a side of the stack in the resonant tube opposite to the heater and wherein a working microfluid is stored in the fluid storing tank and the heater located at the side of the stack heats the working gas such that a temperature greater than a critical temperature

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gradient between the two sides of the stack is formed, and consequently, the acoustic wave is generated.

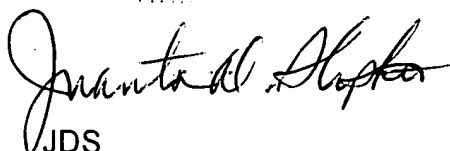
Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juanita D. Stephens whose telephone number is (571) 272-2153. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JUANITA D. STEPHENS
PRIMARY EXAMINER



JDS

August 7, 2006

Juanita D. Stephens
Primary Examiner
Art Unit 2853